

## REMARKS

### 1. Election/Restriction Requirement.

In response to the restriction requirement mailed on March 19, 2004, the Applicant has carefully considered the basis for the restriction requirement and responds as follows.

The applicant considers the restriction requirement unduly limiting, and actually somewhat confusing. Considering claims 4, 5 and 7 (Group II) as drawn to a ***“memory”*** classification ignores the clear statement within Claim 4 of a ***“visual output”***. Furthermore, the consideration of Claim 8 (Group III) as drawn to a ***“power supply”*** ignores the limitation of ***“a plurality of display elements”***. Applicant respectfully requests reconsideration of the restriction requirement.

However, the Applicant elects without travers the invention of Group II (claims 4, 5 and 7) to the display device. The applicant also cancels Claims 1-3, 6, and 8 in order to minimize the overall claim cost.

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### 2. Specification Amendment.

The specification has been amended to correct typographical errors and add clarification as needed, the Applicant apologizes for any inconvenience that may have resulted. Following are the specification changes made.

Amendment of paragraph starting on Page 2, line 2:

The term RGB had not yet been introduced, so the phrase was introduced ***“or multicolor, such as red/green/blue (RGB)”*** to replace the term ***“RGB”***.

A typographical error was corrected replacing ***“have”*** with ***“has”***.

A typographical error corrected replacing ***“certains”*** with ***“certain”***.

Amendment of paragraph starting on page 2, line 13:

a typographical error was corrected with “display” corrected to “display”.

Amendment of paragraph starting on page 14, line 1:

A typo corrected with “test” replacing “testing”.

A typo corrected with the word “chip” dropped preceding universal scanning circuit.

Amendment of paragraph starting on page 14, line 5:

A typo corrected with “Displays” replacing “Display”.

Amendment of paragraph starting on page 18, line 2:

The term “frame” being added to more clearly denote cycle of the APA signal, being a more common term for cycles within a data laden signal. Frames are described elsewhere, for example see page 8, lines 9-14 and page 18, lines 19-21.

Amendment of paragraph starting on page 23, line 19 :

Typographical errors were corrected with “state” inserted in the phrase “their non-volatile state is set to all ones”, and the redundant word “cycle” was removed from another line.

3. Withdrawn Claims 1-3 and 8.

These claims have been withdrawn in response to the restriction requirement.

4. Cancelled Claim 6.

This claim, subject to being withdrawn in response to the restriction requirement, has been cancelled to reduce independent claim fees.

5. Amended Claims 4 - 5.

The applicant has amended claims 4-5 drawn to the elected Group II.

Claim 4. This is an independent claim which has been amended to more clearly recite the aspects of the invention. A portion of the preamble has been moved into the body of the claim describing the single display signal being in serial format and containing the display setting values and clocking signals.

A line was added to further describe the address comparison circuit so that the relationship between the clocking and the retained address value could be understood.

Claim 5. This is a dependent claim based on Claim 4, and the claim was corrected to recite the nature of the display signal instead of controller aspects.

Support for these amendments is found in FIG. 2, 4-6 and throughout the specification.

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6. Addition of Claims 9 - 76.

The applicant has added Claims 9 - 65 to the application.

Claim 9. This claim depends from Claim 4 and recites an embodiment of the visual output element in the form of one or more Light Emitting Diodes (LEDs), and also indicates that at least color of LED may be utilized if the output comprises of more than one LED.

Support for the new claim is found throughout the specification, such as on page 9, line 18: *"Although the addition of a circuit to each LED, or LED cluster, to create a USLED..."*; and page 13, lines 8-9: *"...the chip could be bonded to a substrate to which*

*one or more elements is connected, such as three separately housed RGB elements...".*

Claim 10. This claim depends from Claim 4 and recites that the display signal is either coupled directly to a display element, or coupled through superimposition to the power being supplied to the display element.

Support is provided within the specification, for instance page 7, lines 18 - 22: *"Each display element, such as a USLED, preferably contains power conversion circuits to decode digital signals from the APA signal which are superimposed on the supplied power voltage. It will be appreciated, however, that one or more signal planes may be utilized that are separate from the power planes, although the complexity of the backplane may be significantly increased."*

Claim 11. This claim depends from Claim 4 and recites that the display setting values comprise bits for setting an intensity level and/or color for said visual output element.

Support is found at various places in the specification, including page 8, line 22 through page 9, line 2: *"For display elements which are driven at various intensity levels, the multiple bits of latched output are employed to control a digital or analog intensity control for the output element."* and page 14, lines 20-22: *"...provide a simplified method of driving display arrays that may comprise elements configured to display one or more intensities and/or colors."*

Claim 12. This claim depends from Claim 4 and recites the composition of the display setting values within said display signal as comprising a predetermined number of data bits.

Support is found at various places in the specification, including page 19, lines 1-2: "This particular USLED has red, green, and blue elements each having 256 levels of brightness, so that twenty-four intensity bits are utilized,..."

Claim 13. This claim depends from Claim 4 and recites an aspect of the position clocking signal as *"configured for clocking a counter of said address comparison circuit to advance a position address being compared against said address value retained in memory."* This is an important aspect as the data to an array of the display elements is sent out a serial data string that is picked off by each of the display devices in response to counting their own address value. Therefore, a formed address need not be sent out by a controller which is too slow for use with display arrays.

Support is found at various places in the specification, including FIG. 2, FIG. 4 which depict counters 14, 16 for two axis array display device.

Claim 14. This claim depends from Claim 4 and describes in more detail the position clocking signal which *"comprises a clock which separates display setting values to be displayed along a first dimension of an associated display"*, this aspect describes how clocking advances the column position along a row of display elements in a display array. The specification makes the row and columns can be interchanged in the present invention, and also that single axis or multiple axis display arrays can be supported.

The claim goes on to describe *"an optional clock for advancing output of said display setting values along a second dimension of said display"* which is generally described as the row clock signal, which optionally allows advancing to the next row without the need of reaching the modulo limit of the column counter.

Support is found at various places in the specification, including page 7, lines 22 through page 8, line 3: *"The signals from the backplane are preferably decoded into an intensity (bit) clock, a column clock, a row clock, and a cycle reset. Alternatively, the addressing may use an absolute address instead of the row and column format and may incorporate the intensity clock within the absolute address."*

Also at page 18, lines 7 - 13: *"With each count of the column counter, the address shifts one column position in the array. A row clock is generated at the end of each row of elements, and it causes the row counter 16 to advance and the column count to be reset through OR-gate 18. It will be appreciated that the column counter could overflow to accomplish a similar function, however, using a row clock allows the USLED circuit to be designed to support a very large row length even if just a portion of that row is populated with display elements."*

Claim 15. This new dependent claims recites a means for programming an address into said memory, this was previously claimed and support found through specification, such as at page 6, lines 11-18.

Claim 16. This is a new independent claim drawn to the electronics within a specific embodiment of the display element, as shown in FIG. 2 and FIG. 4.

Summarizing the elements recited in the claim: *at least one optical element, and integrated elements within the circuit for driving it including an input configured for receiving an array position addressing signal, a counter configured for maintaining an array position count, a memory, a comparison circuit configured for generating a data load signal, a latch circuit configured for loading data and a driver configured for outputting said data to modulate the optical state of said at least one optical element.*

Support is found at various places in the specification, including FIG. 2, FIG. 4.

Claim 17. This claim depends from Claim 16 and recites *"said input comprises a single signal line coupled directed to each said display element coupled within a given display array, or superimposed on the power being to each said display element within said given display array"*. FIG. 2 - 6 depict the embodiment in which the array position addressing signal is received over the power bus, and the specification describes the more general case of a separate signal line.

Support is found at various places in the specification, including page 7, lines 18 - 22: *"Each display element, such as a USLED, preferably contains power conversion circuits to decode digital signals from the APA signal which are superimposed on the supplied power voltage. It will be appreciated, however, that one or more signal planes may be utilized that are separate from the power planes, although the complexity of the backplane may be significantly increased."*

Claim 18. This claim depends from Claim 16 and recites *"further comprising a shift register coupled to said input and configured to receive data bits of said array position addressing signal in response to said data load signal; wherein said shift register is configured to output in parallel to said latch the data bits it has received"*.

This aspect of the invention describes how the one or more bits for driving the optical element through the driver can be received in a shift register before being output.

Support is found at various places in the specification, and can be seen as block 22 in FIG. 2, and 82 in FIG. 4.

Claim 19. This claim depends from Claim 16 and recites *"wherein said memory comprises a non-volatile memory"*.

Support is found at various places in the specification, and was included as part of original Claim 7.

Claim 20. This claim depends from Claim 16 and recites setting the memory in a programming operation.

Support is found at various places in the specification, and is described in original Claim 7.

Claim 21. This claim depends from Claim 16 and recites said input being separate from the power and ground connections.

Support is found at various places in the specification, as described for new Claim 10.

Claim 22. This claim depends from Claim 16 and recites the input being received over the power and ground connections.

Support is found at various places in the specification, and described with new Claim 10, as well as at page 6, line 21 through page 7, line 2: *"During operation of the display, a drive voltage is applied between the power and ground plane that contains a superimposed serial APA control signal. The APA control signal comprises cycles within which, one or more data bits are contained for each element."*

Claim 23. This claim depends from Claim 16 and recites the array position addressing (APA) which has the clocking and data received in frames.

Support is found at various places in the specification, including page 7, lines 22 through page 8, line 3: *"The signals from the backplane are preferably decoded into an intensity (bit) clock, a column clock, a row clock, and a cycle reset. Alternatively, the*

*addressing may use an absolute address instead of the row and column format and may incorporate the intensity clock within the absolute address."*

Also on page 7, lines 1-5: *"The APA control signal comprises cycles within which, one or more data bits are contained for each element. A simple On/Off element requires only a single bit of intensity data while an RGB element may utilize twenty-four or more bits for color and intensity selection. Each display element monitors the serial signal pattern on the backplane and it receives its operating instructions at the address within the signal."*

Claim 24. This claim depends from Claim 16 and recites the operation of the driver which can output the data to the optical element at the end of a frame.

Support is found at various places in the specification, including page 18, lines 4-7: *"The reset signal is generated at the end of each cycle (frame), after each active display element has been programmed, and it resets all the counters to an initial state and also triggers the change of state of the display to the newly loaded pattern."*

Claim 25. This claim depends from Claim 16 and recites that the driver *"is configured for modulating the optical state of each of said optical elements to either an on or off state in response to said data from said latch circuit"*, the circuit shown in the figures and described can draw any desired number of bits of data from the frame for output.

Support is found at various places in the specification, including page 7, lines 1-4: *"The APA control signal comprises cycles within which, one or more data bits are contained for each element. A simple On/Off element requires only a single bit of*

*intensity data while an RGB element may utilize twenty-four or more bits for color and intensity selection.”*

Claim 26. This claim depends from Claim 16 and recites that the driver is configured for modulating intensity and/or color.

Support is found throughout the specification, such as page 19, lines 1-8: *“This particular USLED has red, green, and blue elements each having 256 levels of brightness, so that twenty-four intensity bits are utilized, which are clocked into the shift register 22 from the intensity clock being extracted by the converter 12. It will be appreciated that the USLED circuit shown may be used to drive a single LED with up to 256 intensity levels as the relationship of the number of intensity clocks between column clocks determine how many bits are stored to define the intensity. For a single LED a total of eight intensity clocks would be preferably generated between each column clock.”* “”.

Claim 27. This is a new independent claim in a means-plus-function format which describes the at least one optical element and means for modulating the optical state of the optical element in response to APA signal extraction, similar to that described for claim 16, and elsewhere.

The claim also contains a recitation of the optical housing which houses the optical element(s) and the state modulating means.

Support is found throughout the specification, such as found at page 7, lines 4-9: *“Each display element monitors the serial signal pattern on the backplane and it receives its operating instructions at the address within the signal. Thereafter, such as at the end of a signal cycle wherein every display element has received a command,*

*the display elements commence to display the desired state, by utilizing power from the backplane and modulating their own intensity/color based on the information received in the serial signal on the backplane."*

Also page 13, lines 2-9: *"The circuitry may be incorporated within the die of a display LED, or it may be provided as an integrated circuit die to which one or more display elements is bonded such as by a "Flip-Chip" method, or another such means. The circuitry of the present invention would thereby become a carrier for the display element (one or more LEDs) which would then be encased within the optical housing which may appear as a typical LED. Alternatively the chip could be bonded to a substrate to which one or more elements is connected, such as three separately housed RGB elements or an incandescent light."*

Claim 28, 29. These claims depend from Claim 27 and recites different modes of optical element modulation, specifically on/off, intensity control, and the control of color output.

Support was provided within regard to new claims 11, 26 and is found throughout the specification, such as at page 7, lines 2-4: *"A simple On/Off element requires only a single bit of intensity data while an RGB element may utilize twenty-four or more bits for color and intensity selection."*

Claim 30. This claim depends from Claim 27 and recites that intensity is controlled by "an analog or digital intensity control mechanism". Both approaches are described in the specification and with regard to the schematics.

Support is found throughout the specification, such as page 8, line 22 through page 9, line 2: *"For display elements which are driven at various intensity levels, the*

*multiple bits of latched output are employed to control a digital or analog intensity control for the output element."*

Claim 31. This claim depends from Claim 27 and recites how the array position address (APA) signal is utilized by the modulating means, and specifically describes that the APA signal is *"commonly received by a single axis or multiple axis array of optical elements."* This of course describes how the display element is configured for use in a display array which can span one or more axis, the preferred embodiments generally describing a two-dimensional array. The APA signal is received in common (parallel) by all the display elements in the array, which is best shown by the use of superimposing the signal over the power lines to communicate clocking and display to the display elements.

Support is found throughout the specification, such as at page 14, lines 18-19: *"...provide a simplified method of driving display arrays that may comprise single or multiple axis arrays of elements"*.

Claim 32. This claim depends from Claim 27 and recites how the data for driving the display is extracted from the APA signal, specifically *"in response to the value of an array address programmed into said display element"*. The specification describes how data is pulled from the APA signal when the count value matches, or otherwise attains a specific relation with, the address value retained in memory.

Support is found throughout the specification, such as page 8, lines 9-12: *"When the value of the counter matches a stored USLED address, the USLED then clocks in a predetermined number of bits framed on the intensity bit clock from the APA control signal."*

Claim 33. This claim depends from Claim 27 and specifically recites that the array address can be one or more axis of address, which is similar to a portion of Claim 31.

Support for which is found throughout the specification, such as at page 14, lines 7-10: *"A sample of the displays that can benefit from the present invention include: small and large outdoor advertising displays, indoor signage, Christmas-light style light strings (single axis array), Christmas-light style lights with hanging "icicles" (as one or two axis array),..."*

Also as found on page 8, lines 2-5: *"the addressing may use an absolute address instead of the row and column format and may incorporate the intensity clock within the absolute address. Additional addressing clocks may be added, if desired, to support three or more dimensions of addressing."*

Claim 34. This claim depends from Claim 27 and recites the address being a row and column address, which facilitates the conventional arrangement of a 2D display, although the present invention does not have any row and column drivers that conventional approaches require.

Support is found throughout the specification, such as at page 7, line 22 through page 8, line 2: *"The signals from the backplane are preferably decoded into an intensity (bit) clock, a column clock, a row clock, and a cycle reset."*

Claim 35. This claim depends from Claim 27 and recites that a predetermined number of data bits are provided by the APA signal for each position the array to which the display elements of the invention may be coupled.

Support is found throughout the specification, see the support for Claim 34.

Claim 36. This claim depends from Claim 27 and describes a mode of the invention in which the optical state of all display elements coupled to the APA signal are changed at the same time, despite receiving the display data at different times along the serial stream of the APA signal. The specification describes an embodiment in which the display elements change their output state at the same in response to a reset clock.

Support is found throughout the specification, such as page 18, lines 4-7: *"The reset signal is generated at the end of each cycle (frame), after each active display element has been programmed, and it resets all the counters to an initial state and also triggers the change of state of the display to the newly loaded pattern."*

Also found at page 8, lines 12-14: *"Preferably, the bits are stored until the end of the APA control signal cycle at which time they are latched as output to the display elements, such as LEDs in the case of the exemplified USLEDs."*

Claim 37. This claim depends from Claim 36 and recites the fixed position as arising at the end of an APA cycle.

Support is found throughout the specification, such as described for new Claim 36.

Claim 38. This claim depends from Claim 27 and recites the optical elements being *"one light emitting diode (LED) of a desired color, or multiple LEDs of at least one color"*.

Support is found throughout the specification, and has already been supported in other claims, see claim 9. as

Claim 39, 40. These claims depend from Claim 27 and recites the integration of the optical element with the control circuits, which can be on the same die or on separate die that are coupled within the housing.

Support is found throughout the specification, such as page 13, lines 2-5: *"The circuitry may be incorporated within the die of a display LED, or it may be provided as an integrated circuit die to which one or more display elements is bonded such as by a "Flip-Chip" method, or another such means."*

Claim 41. This claim depends from Claim 27 and recites an embodiment of the modulating means. These circuit elements are claimed in new independent claim 16 and are shown in the schematics and described within the specification.

Support is found throughout the specification and in FIG. 2-4, and support was described for Claim 16.

Claim 42. This claim depends from Claim 27 and recites an embodiment for programming the array address within the display element. Specifically the claim recites the inclusion of *"means for detecting a programming signal while said display element is in a programming mode; and means for programming the position within said cycle of an array position addressing signal at which said data is extracted in response to the detection of said programming by said detection means"*.

Support is found at many places in specification, such as page 10, lines 2-6: *"The preferred method of programming the addressing for the USLEDs is with an aspect of the present invention referred to as in-situ optical programming. A photodetector within each USLED is capable of detecting the presence of light. This photodetector preferably utilizes the PN junction of a/the display LED in either forward*

or reverse mode.” The means for detecting the programming signal is embodied as a photodetector, while the means for programming comprises circuitry for programming as address into the memory of the device.

Claim 43. This claim depends from claim 42, and recites the means for programming as being a *“a non-volatile memory configured for retaining information about the position within said cycle; and a circuit for loading a counter value, tracking said position within said cycle of an array position address signal, into said non-volatile memory in response to detecting the presence of light while said non-volatile memory is in a programming state.”* These aspects being described in detail within the specification.

Support is found in the specification, for example in the support provided for new Claim 42 and at page 11, lines 3-9: *“When a sufficient light level impinges on a USLED which is in programming mode, then the counter value is programmed as an address into a non-volatile memory within the USLED. The non-volatile memory may be in the form of FLASH cells, OTP cells, or alternative non-volatile storage. It will be readily understood, therefore, that each USLED is being programmed to match up with the operation of the programming array.”*

Claim 44. This claim depends from claim 27, and recites that the APA signal can be received on a single input or superimposed on the power being supplied to the display element.

Support is found in the specification, see support provided for new claim 10.

Claim 45. This claim depends from claim 27, and recites more specifically the connection of the display element to a power bus (power and ground) line or plane, from which power and signal is received.

Support for a similar claim was provided for claim 10, while support may be found in the specification, such as at page 6, line 21 through page 7, line 2: *"During operation of the display, a drive voltage is applied between the power and ground plane that contains a superimposed serial APA control signal. The APA control signal comprises cycles within which, one or more data bits are contained for each element."*

Also at page 7, lines 18 - 22: *"Each display element, such as a USLED, preferably contains power conversion circuits to decode digital signals from the APA signal which are superimposed on the supplied power voltage. It will be appreciated, however, that one or more signal planes may be utilized that are separate from the power planes, although the complexity of the backplane may be significantly increased."*

Claim 46. This claim depends from claim 27, and recites the composition of the array position addressing signal having data and clocks separating the data.

Support was provided for similar claim 14, and found in the specification such as at page 8, lines 9-12: *"each USLED thereby extracts clocking signals to drive one or more internal counters. When the value of the counter matches a stored USLED address, the USLED then clocks in a predetermined number of bits framed on the intensity bit clock from the APA control signal."*

Also at page 7, lines 4-5: *"Each display element monitors the serial signal pattern on the backplane and it receives its operating instructions at the address within the signal."*

Claim 47. This is a new dependent claim having two mean-plus-function claim elements along with other elements. The claim includes the “optical element” and “memory” recited in other claims along with a “means for extracting data” and “means for modulating the output of said at least one optical element”.

Support is found in new Claim 27, whose means element: *“means for modulating the optical state of said at least one optical element in response to data extracted at a given position within a cycle of an array position addressing signal which supplies serial data to be commonly received in parallel by a plurality of said display elements;”*, contains both aspects recited in Claim 47.

Support is found for new claim 47, and in the specification, such as in original Claim 1, *“said display element adapted to extract a display setting upon finding an address match”*. Also referring to page 7, lines 7-9: *“...the display elements commence to display the desired state, by utilizing power from the backplane and modulating their own intensity/color based on the information received in the serial signal on the backplane.”* An embodiment of the means elements for example are described in detail at page 8, lines 8-12: *“From the applied power with superimposed signal, each USLED thereby extracts clocking signals to drive one or more internal counters. When the value of the counter matches a stored USLED address, the USLED then clocks in a predetermined number of bits framed on the intensity bit clock from the APA control signal.”*

Claim 48. This claim depends from claim 47, and recites that the addressing spans “at least one axis of addressing”. The specification describes addressing being used for single axis, two axis, or multiple axis addressing.

Support is found in the specification, see support for claim 33 which is similarly worded.

Claim 49. This claim depends from claim 48, and recites the embodiment where the address comprises row and column addressing.

Support is found in the specification and given for similar claim 34.

Claim 50. This claim depends from claim 47, and recites the data extracting means as *“configured for extracting a predetermined number of data bits from a given position within a cycle of said array position addressing signal”*. The specification describes extracting a single bit per optical element, up to twenty four bits for a intensity control on a three color display, as well as indicates that any number of bits can be used.

Support is given for other claims and found in the specification, including page 7, lines 1-4: *“The APA control signal comprises cycles within which, one or more data bits are contained for each element. A simple On/Off element requires only a single bit of intensity data while an RGB element may utilize twenty-four or more bits for color and intensity selection.”*

Claim 51. This claim depends from claim 50, and recites the nature of an embodiment of the extracting means using the clocks to determine the position within the data signal that the data is to be extracted. This claim is similar to some of the other claims.

Support is found in the specification, including page 8, lines 8-12: *“each USLED thereby extracts clocking signals to drive one or more internal counters. When the value of the counter matches a stored USLED address, the USLED then clocks in a*

*predetermined number of bits framed on the intensity bit clock from the APA control signal.”*

Claim 52. This claim depends from claim 51, and recites the clocks being row and column clocks.

Support is found in the specification, including page 18, lines 7 - 13: *“With each count of the column counter, the address shifts one column position in the array. A row clock is generated at the end of each row of elements, and it causes the row counter 16 to advance and the column count to be reset through OR-gate 18. It will be appreciated that the column counter could overflow to accomplish a similar function, however, using a row clock allows the USLED circuit to be designed to support a very large row length even if just a portion of that row is populated with display elements.”*

Claim 53. This claim depends from claim 50, and recites the use of the reset clock to reset addressing to an initial state, the embodiments describe a state in which the counters are reset back to zero.

Support is found in the specification, including page 18, lines 4-8: *“The reset signal is generated at the end of each cycle (frame), after each active display element has been programmed, and it resets all the counters to an initial state and also triggers the change of state of the display to the newly loaded pattern. With each count of the column counter, the address shifts one column position in the array.”*

Claim 54. This claim depends from claim 50, and describes embodiments of the device which receive a single line data signal or an data signal over the power line.

Support is found in the specification, see the support for similarly structured claim 10.

Claim 55, 56. These claims depend from claim 47, and describe an embodiment in which the optical outputs of the display element are updated at a specific position in the data signal, with claim 56 being more specific to the end of the data cycle. It will be appreciated that this allows the outputs of an array of the display elements to change simultaneously.

Support is given for similar claims 36 and 24.

Claim 57. This claim depends from claim 47, and recites an embodiment containing circuits for implementing the extracting means recited in base claim 47.

Support is found for these elements in FIG. 2, FIG. 4, described in the specification and have been already given for Claim 16.

Claim 58. This claim depends from claim 47, and describes an embodiment of the modulating means as containing a latch and driver. It will be seen that these elements perform the actual modulation of the display element output.

Support is found in the FIG. 2, FIG. 4, and the specification, such as at page 19, lines 12-15: *"The reset clears all the counters and triggers the loading of a latch-24 from the shift register 22. The output of latch 24 is set according to the updated data and signals are provided to drivers 26a, 26b, 26c, for each of the corresponding LEDs 28a, 28b, 28c."*

Claim 59. This claim depends from claim 58, and describes that the latch is configured to latch and output the data in response to a predetermined position within each cycle of the array position addressing signal.

Support is found in the specification, such as at given for Claim 58.

Claim 60. This claim depends from claim 47, and describes an embodiment of the optical element, which can comprise one or more LEDs, and multiple colors can be used.

Support is found in the specification, and already provided for similar Claim 9.

Claim 61. This is a new independent claim which is similar to Claim 47, but describes the programmed addressing in a slightly different manner. Additionally, this claim recites certain elements which were contained in original Claim 1.

Support is provided throughout the specification and aspects of the claim were supported for Claim 47, and originally found in original claim 1. Additionally, the following portions of the specification provide material on an embodiment; page 6, lines 17-18: *"After programming, each display element retains, such as in FLASH memory, the address within the array that it is to be responsive to."*

Also at page 30, lines 16-19: *"The method involves the use of address encoding within the display elements which may be performed within the target circuit. Each display element extracts addressing information from the power bus over which data is superimposed."*

Claim 62. This is a dependent claim which recites a *"means for programming said memory to said first address in response to the position of the display element within an array of the display elements"*.

Support has already been provided in relation to some other claims and is also found, among other places, at page 6, lines 13-18: *"One aspect of APA on USLEDs involves a technique of in-situ optical programming wherein the USLEDs are programmed from an optical source array (generally a matching, or a superset, of the*

*target USLED array) which programs a position address into each USLED on the target array. After programming, each display element retains, such as in FLASH memory, the address within the array that it is to be responsive to."*

Claim 63. A dependent claim which recites aspects of the programming means which is *"configured for loading said second address from the data signal in response to a programming signal received by said display element and not by other display elements within an array which are not to respond to given said second address."* This describes a typical embodiment in which each display element in an array extracts data from a single address (although embodiment described for having multiple elements, on different synchronized displays, retrieving the same data: page 8, lines 17-21).

Support is provided throughout the specification, such as page 6, lines 13-18 as well as page 10, line 19 through page 11, line 14.

Claim 64. This is a dependent claim which recites that the *"programming means is configured to program said second address in response to a combination of data received from said data signal and said programming signal"*.

Support is provided for claim 63 above, as well page 12, lines 6-13.

Claim 65. This is a dependent claim which recites an "optical detector" being used for receiving said programming signal.

Support for this element was provided for Claim 63.

Claim 66, 67. These are dependent claims which recite aspects of the optical detector, such as may comprise *"one or more of said at least one optical elements which are configured for both displaying optical states and detecting optical*

*input” or “comprises at least one separate optical input sensor integrated within said display element”.*

Support is found throughout the specification, such as at page 10, lines 3-7: *“A photodetector within each USLED is capable of detecting the presence of light. This photodetector preferably utilizes the PN junction of a/the display LED in either forward or reverse mode. An array of unprogrammed USLEDs are first attached between power and ground which is connected to an APA controller”.*

Claim 68. This is a dependent claim which recites receiving of the control data on the data signal.

Support is found in the specification, such as in the description of “universal scanning display elements, see page 5, lines 17-19: *“By way of example and not of limitation, the display elements of the present invention will hereafter be referred to as universal scanning display elements,...”.*

Also at page 20, lines 7-9: *“The prequalification also allows the use of random addressing wherein only the sections of the array which have changed need to be updated with new display data.”*

And also at page 15, lines 18-19: *“Another object of the invention is to provide a display array in which elements or areas within the array can be randomly accessed and loaded with new display settings...”.*

Claim 69. This is an independent claim which recites the optical element, memory, means for extracting and means for modulating, as have been recited in claim 47 and elsewhere. This claim describes in more detail the storage of a first address within the memory in response to the position of the display element within an array of

the display elements.

Support is found through the specification and is a central aspect of the invention, such as described at page 6, lines 11-13: *"The USLEDs of the present invention incorporate what is being referred to herein as Array Position Addressing (APA) which allows the elements to be controllable addressed without the need of individual row and column lines"*.

Claim 70. This is an independent claim which is similar to claim 69, but encapsulated in a claim having a single means term. The means term still relates the matching of the first address and second address and the outputting of optical state data.

Support was provided for the other independent claims, and again is found throughout the specification.

Claim 71. This is a dependent claim which recites the outputting means "is configured for programming said second address in-situ". This is described page 6, lines 13-17: *"One aspect of APA on USLEDs involves a technique of in-situ optical programming wherein the USLEDs are programmed from an optical source array (generally a matching, or a superset, of the target USLED array) which programs a position address into each USLED on the target array"*.

Claim 72. This is a dependent claim which specifically recites that the outputting means *"is configured for receiving said data signal in parallel with other display elements within the array of display elements"*. This aspect of the invention is important in that display elements can fail, or be removed, without disrupting display operation.

Support is found throughout the specification and is particularly clear with regard to FIG. 5.

Claim 73. This is a dependent claim which recites the non-volatile memory within said outputting means for storing the second address.

Support for non-volatile memory was found in original claim 2, and elsewhere.

Claim 74. This is an independent claim which recites steps for updating a display element within an array of display elements. This functions listed here generally comport to the circuit listed for claim 16, and elsewhere described for the invention.

Support is found in the specification, such as listed for claim 16, and given at page 18, line 16 through page 19, line 20.

Claim 75. This is a dependent claim which recites that the data signal extracted from a two lead power bus.

Support was provided in relation to original claim 8, and support for new claim 10 as well as others.

Claim 76. This claim depends from claim 74, and recites an embodiment of the optical elements within the display elements as being one or more LEDs, which can be single or multiple colors.

Support is given for other similar claims 9, 38 and 60.

7. Additional Claim fees.

The application as originally filed included the payment for twenty (20) total claims and up to three (3) independent claims. A total of sixty-eight (68) claims have been added to the eight (8) original claims, wherein forty five (52) total claims are being

paid for in excess of the statutory twenty. Four (4) independent claims have been added beyond the five (5) already paid.

A fee is enclosed for fifty-two (52) additional total claims and four (4) additional independent claims. The total fee enclosed is  $((4 \times \$ 43) + (52 \times \$9) = \underline{\$683})$  which has been included with the amendment.

8. Information Disclosure.

A licensee for the technology had found some additional patents in the field of the invention to be considered during examination, these were found not to have been listed on the previous IDS forms submitted on January 24, 2002 and July 18, 2003.

Therefore, a supplemental IDS is being sent on the mailing date of this response in a separate box with separate payment.

Applicant respectfully requests confirmation of entry of all these IDS elements within the upcoming office action on the merits.

9. Conclusion.

The amendment modifies, and/or adds, a number of claims within the present application. Any changes to the specification are considered by the applicant to correct typographical errors or improve clarity while not adding new matter to the application. The amendment adds a number of claims to the application which are believed to be in a condition for allowance.

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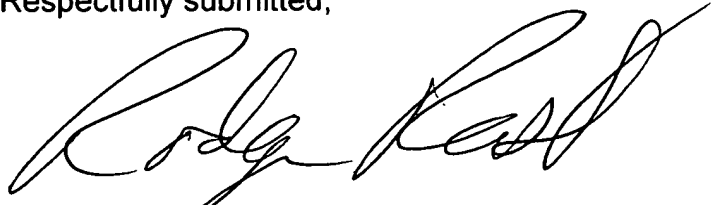
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The Applicant respectfully requests a phone interview with the Examiner to clarify any issues that arise upon examination on the merits of the present application, if an allowance of all claims does not appear forthcoming.

Date:

April 17, 2004

Respectfully submitted,



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